

# How I Know There Are No Aliens

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BY STEPHEN ARTHUR July 2020



Photo: ESO/Y. Beletsky

The Great Silence contradicts what should be. Intelligent alien species should be millions or billions of years more advanced than us because most star systems are several billion years older than ours. It should only take a million years for one of these aliens or their machine descendants to colonize the galaxy, whether directly or through self-replicating robotic probes. So techno-signatures from their god-like astroengineering should be abundant. Their cosmic energy footprint should be huge, easily discernible in star spectra and thermal anomalies. By now we should be saturated with robotic probes. Our solar system should have been obviously altered by thousands of completely different alien species over a time longer than the history of animal life on Earth. If not that, then their distant energy footprint should include widespread electromagnetic transmissions and other by-products. Using the total energy of stars or black holes should produce unnatural light spectra across the galaxy, which should have been noticed by astronomers for a century. Even if all these diverse species now live as nothing but undetectable information or in total harmony with nature, the signs of their history should be plainly visible.

Having been a biologist and neuroscientist and sci-fi reader, my lifelong dream was to witness First Contact or at least the proof that aliens are out there. But we have instead the Great Silence: no sign after 60 years of searching. To make matters worse, all but two of the 75 explanations of the Great Silence—scenarios such as early self-destruction, no space exploration, no growth or greed, “transcendence” into virtual reality, the “zoo” hypothesis, or hiding from each other (Cixin Liu’s “Dark Forest”)—depend on a fallacy that I call “imagining a single alien nation”. In reality there would be thousands of independently evolved alien planets, with colossal delays in communication that prohibit any unified multispecies civilization or even coordination between them (exchanging messages would take thousands of years at the speed of light). It only takes one alien species (or subgroup or individual) to buck the trend.

One of the two remaining scenarios is that one malevolent super-advanced species systematically eradicated all other intelligent species (or forced them into hiding) and also somehow hid their historical energy footprints. But we must keep in mind the vast time frame of slow biological evolution versus fast technological development. Newly evolved advanced aliens would be millions of years behind in technological power. So the hypothetical eradicating aliens would have nothing to fear from newer species and would not need to cover their tracks.

Finally, the last remaining scenario is the “phase-transition” model of astronomer James Annis. The model assumes that gamma-ray bursts from hypernovas can eradicate all animal life across the galaxy and these bursts were much more frequent in the distant past. So now, after a very long period of evolutionary setbacks, thousands of alien civilizations are emerging alongside us, and none can be much more advanced than us. Unfortunately, it turns out that the gamma radiation is too short-lived (one minute) and too far away (not in the galactic habitable zone). The main effect is a loss of the ozone layer on one side of the planet, from which it would soon recover (the Ordovician mass extinction might be a worst-case example).

I was betting on Annis’ phase-transition model. After the shock of discovering that his model doesn’t work, I quickly checked to see if the number of potential planets with life might be low enough to help explain the Great Silence. I made a rough calculation using very conservative estimates. Stars in the Milky Way galaxy: 200 billion. Percentage of Sun-like stars: 25%. Percentage in the Galactic Habitable Zone (away from the radiation of the inner galaxy): 5%. Percentage with solid planets in the star’s habitable zone (now possible to estimate from the thousands of exoplanet detections): 10% (range 10-40%). Percentage of those planets with a large collision-created moon (required for plate tectonics and magnetic field, Gribbon): 0.1% (based on frequency of dust observed in star-system formation).

Percentage of these with life: 100%. This number for life has to be this high because there is astonishing evidence that all Earth-like planets should generate life almost immediately after formation due to inevitable deep-sea precipitation of non-volcanic, porous, alkaline hydrothermal vents (electrochemical reactors with metal catalysts) and that all alien life must therefore be surprisingly similar to Earth life (including chemiosmosis, mitochondria, the Krebs Cycle, RNA/DNA, and even the same triplet code, as explained in Nick Lane's *Life Ascending*). Percentage that are one to five billion years older than Earth: 50%.

The result is 42,000 exoplanets in just our local third of the galaxy's habitable zone that could have evolved advanced civilizations long before the appearance of *Homo sapiens* (total 126,000 in the whole galaxy)—and there is no reason to think they are all extinct. We should definitely be seeing a footprint. An extensive 2020 physics paper (Westby and Conselice) even increases my estimate by a factor of 13 and calculates that if the alien civilizations' average lifespans are a million years then the maximum distance to the nearest advanced aliens is a mere 20 light years. Contrary to the press on this study, their result does *not* show that aliens should be rare—only rare if they all self-destruct in 100 years, a ludicrous minimal estimate in my opinion. But debating the specifics of formulas and data are moot; no matter how it is calculated, the number will remain very large.

Given that the explanations involving the behaviour of aliens have been debunked, I think the only way that 99.9% of these 42,000 potential ancient aliens could have been aborted is that there is a major bottleneck or series of bottlenecks in evolution, such as the origin of photosynthesis. The odds of getting through that bottleneck may be 42,000:1 and Earth is the one planet that got through in the nearest habitable third of our galaxy. The odds that another planetary civilization is emerging at the same time as us—not millions of years earlier or millions of years later—is vanishingly small.

My argument against the existence of aliens is not the familiar “rare Earth” hypothesis. On the contrary, this counterintuitive argument becomes stronger as more habitable-zone exoplanets are discovered or the need for plate tectonics or oxygen is questioned. If red dwarf systems, moons, and the numerous rogue planets are candidates, too, the disparity increases momentously. Ironically, because the billion-year footprint is the deciding issue, the more planets with potential for microbial life, the less likelihood that intelligent aliens ever did evolve.

Astronomers have determined that no other galaxies host super-advanced aliens (*Scientific American* April 2015). Despite a seemingly atavistic, anti-Copernican view, I think we must accept that we are alone. Despite the relative stupidity, evil, and insanity of our planet's civilizations, humans are the most amazing and precious thing in our galaxy, and for all intents and purposes, in the universe.

You might think that it is hubris to state in my title that “I know”. Maybe my argument is merely an educated intuition (by an INTJ personality). But it is taking a stand. Until now, my desire to know led me to contemplate becoming a cryonics patient on my deathbed for the chance of being resuscitated in the far future to find out. Being able to take this stand, that there is nothing to find out, allows me to relax and accept that now I’m old enough to die in peace. Taking this stand, I’m tempted to suggest that we all might be better off if we stopped looking outward and started looking inward at ourselves, each other, and the biosphere—the most amazing and precious things in the whole universe.

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